





LOUGHBOROUGH BUSINESS SCHOOL

Net Zero Methodology

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Introduction

The topic of climate change has become one of humanity's most critical problems today. Like many other nations, the UK is making aggressive efforts to solve this issue. The Net Zero (NZ) method is one of the most significant solutions currently being studied. The NZ approach aims to reduce greenhouse gas emissions to zero by 2050, and it has been recognised as a critical pathway towards mitigating climate change.

The UK government has made significant progress towards reducing its carbon emissions in recent years. The country has already reduced its emissions by 44% from 1990 levels, exceeding the target of a 34% reduction set for 2020. However, to achieve the NZ target, all businesses in the UK will need to make even more significant reductions. The NZ approach will require a radical shift in how the country produces, transfers, and uses energy. From the micro level, the NZ approach will also require businesses to reduce their carbon footprint internally and externally proactively.

The methodology aims to help companies and regions achieve the NZ target by providing individual practitioners and policymakers with potential best practices from different perspectives collected from the literature.

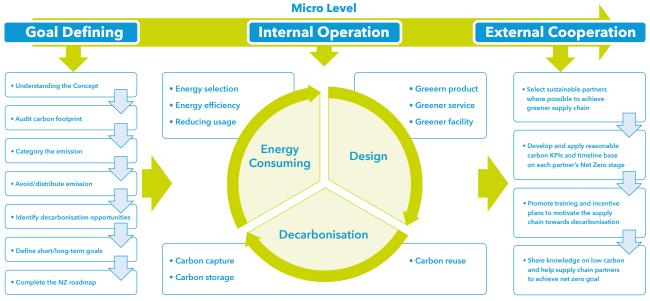
Overall Framework

Macro Level	Energy Structure	Energy Generation	Conventional Power Conventional Power	
			• Coal • Natural gas • Oil	Hydropower Municipal solid waste Huclear power Wind Biogas Hydrogen Geothermal
		Energy Transmission	Ultra High Voltage Transmission Power Flo	• Dynamic Line Ratings • Topology Optimisation • Wireless electricity transmission
		Energy Storage	Mechanical storage Electrical	storage • Chemical storage • Electrochemical • Thermal storage
	Trade		Emission Table Energy Tr	ade • Energy As A Service • Distributed Energy Resources
Micro Level	Process of Enterprises		Goal Defining	Internal Consideration External Consideration
	Energy Consuming	Energy Selection	• Understand the overall policies and regulations towards net zero target	Photovoltaics systems • Purchase/use green power Select sustainable partner to achieve greener supply chain
		Energy Efficiency	Company carbon footprint auditing Identify the avoidance/unavoidable emission Define the ways to reduce the avoidable emission Define the distribution of the unavoidable emission Identify the opportunities of decarbonisation	Recovery energy from waste Apply new process and tools to improve overall efficiency
		Reducing Usage		 Promote energy saving concept to all employees Reduce unnecessary Promote work travel or office waste from home Establish appropriate standards and add carbon footprint as assessment point during develop and design phase Increase in the share of low/zero carbon product Increase in the share of low/zero carbon service Upgrade the building with energy myst, system AC systems
	Design	Greener Product		
		Greener Service		
		Greener Facility		
	Decarbonisation	Carbon Capture		Plant trees Inductrial separation Pre-combustion Post-combustion Oxyfuel
		Carbon Storage	Summarise the short/long-term net zero Goals for bothinternal and external	• Biochar • Ocean sequestration • Soil sequestration • Mineral sequestration • Cement sequestration
		Carbon Reuse	• Define the Net-zero roadmap that fits the company	Extraction of oil • Starch • Construction material • Feed algae • Cement

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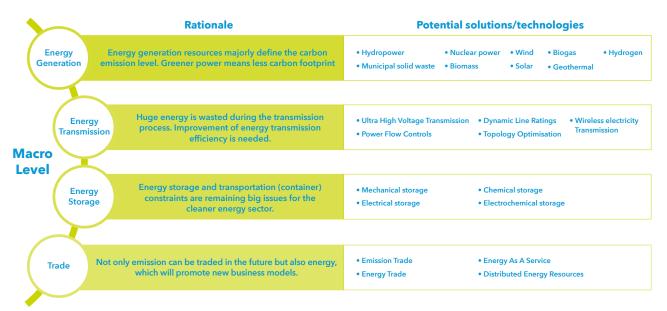
As the NZ methodology aims to guide business and society, it is separated into two parts: Micro Level and Macro Level.

Micro Level:



- The micro-level NZ methodology begins with goal definition. To begin planning actions, businesses must have a thorough comprehension of the topic and a quantification of their current state. Setting specific and measurable goals for reducing emissions and achieving NZ status in the short-, medium-, and long-term can help businesses monitor their performance and even compare themselves to other businesses.
- The internal NZ operation strategy can be broken down into energy consumption, design, and decarbonisation. Companies should carefully select the energy they consume and look for ways to reduce their consumption. Better-designed products, services, and buildings can significantly increase energy efficiency from a design perspective. Multiple mature technologies can assist businesses in capturing, storing, and reusing carbon emissions generated during operation processes.
- Scope three emissions consist of all emissions occurring upstream and downstream of an organisation's operations. Consequently, external cooperation is also required to reach NZ. Because scope three emissions are indirect and occur throughout the entire value chain, measuring and controlling them is frequently more difficult. Therefore, greater supply chain transparency is required. Knowledge exchange, key performance indicators (KPIs), and even incentive plans can help the company better manage its scope three emissions.

Macro Level:



- Energy generation: Macro-level energy generation involves producing energy on a large scale, often through power plants, wind turbines, or solar farms. It is important because it enables the transition to low-carbon energy sources and helps to reduce greenhouse gas emissions. Increasing the share of renewable energy sources in the energy mix is essential to achieve a NZ approach.
- Energy transmission: Once energy is generated, it needs to be transmitted from the source to the end user. High-efficiency energy transmission networks can potentially save 5%-6% of energy, but also require heavy investment to upgrade the grid.
- Energy storage: Energy storage technologies, such as batteries and pumped hydro storage, are important for balancing the supply and demand of energy. They enable the integration of intermittent renewable energy sources, such as wind and solar, into the energy system and help to ensure a reliable and resilient energy supply.
- Carbon trade: Carbon trade involves the buying and selling of carbon credits, which represent a reduction in greenhouse gas emissions. It is a market-based mechanism for reducing emissions and incentivising companies and organisations to invest in low-carbon solutions. Carbon trade can help to accelerate the transition to a NZ approach by creating economic incentives to reduce emissions.

Loughborough Business School is the natural choice for purpose-led people and organisations who want to align their success with the needs of communities and the planet.

We are sharing and shaping the newest ideas to help tackle some of the world's biggest problems.

By transforming theory into practice, and forging deep partnerships with purpose-driven organisations, our academics are pushing forward innovations that are changing business – and the world – for the better.

The Supply Chain Resilience Hub is part of WMG at the University of Warwick and supported by the WMG Centre High Value Manufacturing Catapult.

An academic department of the University of Warwick, WMG is a world leading research and education group.

WMG has internationally recognised facilities and expertise in supply chain operations and organisational transformation. Our supply chains research group applies customer responsive supply chain theory into practical solutions that generate both economic and societal value.

Collaborating with industrial partners, we seek to resolve complex business and organisational problems across agrochemcials, automotive, defence, consumerpackaged goods, retail and pharmaceuticals.

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The information contained in this report was correct at the time of going to print.